

ANTISPASTICITY AID DEVICE AND RELATED ACCESSORIES

Field of Invention

The invention pertains to devices designed to aid stroke victims and others suffering from spasticity. More particularly, the invention relates to a hand brace constructed to hold
5 the thumb and fingers in a flattened arrangement and a series of devices designed to aid in the re-education of a stroke victim's muscles after a stroke.

Background of the Invention

Various devices have been developed to provide comfort and assist in the
10 rehabilitation of those suffering from spasticity of the hand muscles. In order to prevent cramping, nerve damage and possible muscle atrophy, it is often desirable to maintain the patient's hand in a planar orientation. Toward this end, many splint-like devices have been developed. None of the devices so far developed provide adjustments for radial orientation of the patient's thumb.

15 U.S. Patent No. 5,121,743 issued to *Bishop* is directed to a hand-restraining device made of a rigid material. The hand-restraining device consists of a support member and a series of restraining straps used to secure a hand through the front surface of the support. A rigid knuckle-restraining piece on one of the straps is used to prevent bending of the knuckles. Two thumb/baby finger portions are included and the rear portion is extended to engage the
20 forearm of the user.

U.S. Patent No. 3,707,963 issued to *Keropian*, discloses an articulated hand brace. Here, a very complex articulated thumb guide is pivotally coupled to a portion of a hand support.

U.S. Patent No. 6,482,168, issued to *Betcher* is directed to an upper extremity hand orthosis and method of use. The hand orthosis has a palm area in which a hand is positioned for support of a patient's fingers and right or left thumb in a spaced apart configuration. Two separate pairs of overlapping and connectable straps are positioned to encircle the hand, wrist and fingers of the user to keep movement to a minimum.

U.S. Patent No. 5,921,945, issued to *Gray* is directed to a splint/therapeutic device. The splint can restrict a user's hand to a desired body position and provide a pre-selected degree of mobility, such as preventing the fingers of the hand from curling toward the wrist. Various straps and hook-and-loop type fasteners may be used as needed.

U.S. Patent No. 6,561,995, issued to *Thibodo, Jr.* is directed to a splint system for two or more adjacent fingers of the hand. The splint can be used for maintaining the fingers in a straight line.

U.S. Patent No. 3,762,401, issued to *Tupper* is directed to a surgical retractor. A hand is positioned on a thin flat paddle-shaped pallet such that the fingers lie on the pallet between pairs of elongated slots, with the wrist lying between another pair of elongated slots such that, with the use of elastic finger bands and wrist bands, the hand is held in place and flexing of the fingers is prevented.

While other variations exist, the above described designs for hand supports and splints are typical of those encountered in the prior art. It is an objective of the present invention to provide a hand support for spasticity victims that maintains the hand in a planar orientation. It

is a further objective to provide a support that is comfortable for the spasticity victim to wear and is easily installed and removed. It is a still further objective of the invention to provide the above-described capabilities in an inexpensive and durable support that may be easily cleaned and is light in weight. It is yet a further objective to provide a series of accessories for
5 use with the support that will encourage retraining of the muscles of the spasticity victim's hand and arm.

While some of the objectives of the present invention are disclosed in the prior art, none of the inventions found include all of the requirements identified.

10 Summary of the Invention

The present invention addresses all of the deficiencies or prior stroke victim aid inventions and satisfies all of the objectives described above.

(1) An antispasticity aid device providing the desired features may be constructed from the following components. A planar hand-mounting member is provided. The planar hand-
15 mounting member is formed of rigid material and is sized and shaped to extend beyond the outer dimensions of a human hand without a thumb. The planar hand-mounting member has an upper surface, a lower surface, a front edge, a rear edge, a first side edge and a second side edge. The hand-mounting member has at least two first fastening slots located adjacent to the first and second side edges, respectively. A first restraining strap is provided. The first
20 restraining strap is size and shaped to fit slidably through the first fastening slots and has a means for adjusting a length of the first strap. A thumb-mounting member is provided. The thumb-mounting member is formed of rigid material and is sized and shaped to extend beyond the outer dimensions of a human thumb. The thumb-mounting member has an upper surface,

a lower surface, a front edge, a rear edge, a first side edge and a second side edge. The thumb-mounting member has at least two second fastening slots located adjacent to the first and the second side edges of the thumb-mounting member, respectively. A second restraining strap is provided. The second strap is sized and shaped to fit slidably through the second fastening slots and has a means for adjusting a length of the second strap. The thumb-mounting member is rotatably attached at its rear edge to the first side edge of the hand-mounting member. This permits the thumb-mounting member to rotate through an arc in the plane of the hand-mounting member whereby, when a hand of a stroke victim is placed upon the hand-mounting member, the first restraining strap is located over the hand and through the first fastening slots. The length of the first restraining strap is adjusted to hold the hand in firm contact with the hand-mounting member and when a thumb of a stroke victim is placed upon the thumb-mounting member, the second restraining strap is located over the thumb and through the second fastening slots. The length of the second restraining strap is adjusted to hold the thumb in firm contact with the thumb-mounting member. The thumb-mounting member is adjustable with respect to the hand-mounting member for comfort of the stroke victim.

(2) In a variant, the means for adjusting the length of either the first or second restraining straps is further comprised of a hooking element located adjacent to a first end of the restraining strap. A looping element extends from a second end of the restraining strap toward the first end whereby, when the hooking element is attached to the looping element at different points along the length of the restraining strap, the length of either of the first or the second restraining strap is adjusted.

(3) In another variant, the thumb-mounting member is lockable in a plurality of positions about a point where it is rotatably attached at its rear edge to the first side edge of the hand-mounting member.

(4) In yet another variant, a first accessory is provided. The first accessory is comprised of an armrest portion. The armrest portion is formed of planar semi-rigid resilient material, has a hand-shaped section and an extension section. The hand-shaped section has a distal end and a proximate end and is sized and shaped to support the antispasticity aid device. The extension section has a first end and a second end and has a length less than a distance from an armpit to a wrist of a stroke victim. The extension section is attached at the first end to the proximate end of the hand-shaped section. The first accessory is attached to the antispasticity aid device by either the first and the second fastening straps or the hooking and the looping fastening portions whereby when the first accessory is attached to the antispasticity aid device and the antispasticity aid device is attached to the hand of a stroke victim, an arm of the stroke victim may be comfortably positioned on an arm of an armchair or sofa.

(5) In yet a further variant, an upper padding portion is provided. The upper padding portion is formed of resilient padding material and is sized and shaped to fit over an upper surface of the extension section of the armrest portion. Whereby, when the first accessory is attached to the antispasticity aid device, the antispasticity aid device is attached to the hand of a stroke victim and the upper padding portion is positioned over the extension section, the arm of the stroke victim will be more comfortably positioned upon the first accessory.

(6) In still yet another variant, a lower padding portion is provided. The lower padding portion is formed of resilient padding material and is sized and shaped to fit over a lower surface of the extension section of the arm-rest portion. Whereby, when the first accessory is

attached to the antispasticity aid device, the antispasticity aid device is attached to the hand of a stroke victim and the lower padding portion is positioned under the extension section, the arm of the stroke victim will be more comfortably positioned upon the first accessory.

(7) In a further variant, the extension section tapers in a vertical plane from the first end to the second end, thereby lowering a point of contact adjacent to an armpit of the stroke victim.

(8) In still another variant, the upper padding portion is formed of an FDA approved foam material.

(9) In yet another variant, the lower padding portion is formed of an FDA approved foam material.

(10) In still yet another variant, the extension section is covered with washable material.

(11) In yet another variant, the washable material is removable and replaceable.

(12) In a further variant, the second end of the extension section is comprised of a padded portion. The padded portion is sized and shaped to fit comfortably into the armpit of a stroke victim.

(13) In yet another variant, at least one pair of attachment slots is provided. The attachment slots are located along side edges of the extension section between the first end and the second end and is sized and shaped to accommodate an attachment strap.

(14) In another variant, either a hooking portion or a looping portion of a removable attachment device is provided. The portion is affixed to an upper surface of the hand shaped section. The portion provides a mechanism for removably attaching to the antispasticity aid device.

(15) In still yet another variant, a second accessory is provided. The second accessory is comprised of a support platform. The support platform is formed of planar semi-rigid,

resilient material, an upper surface, a lower surface, has a hand-support section and an arm support section. The hand support section has a distal end and a proximate end and is sized and shaped to support the antispasticity aid device. The arm support section has a first end and a second end and has a length less than a distance from an armpit to a wrist of a stroke victim. The arm support section is attached at the first end to the proximate end of the hand-support section. The second accessory is attached to the antispasticity aid device using either the first and the second fastening straps or the hooking and the looping fastening portions. A planar base is provided. The planar base has an upper surface, a lower surface and is sized and shaped to fit beneath the support platform. A leaf spring is provided. The leaf spring has an upper section and a lower section and is formed with an acute angle between the upper section and the lower section. The upper section is affixed to the lower surface of the support platform and the lower section is affixed to the upper surface of the planar base. Whereby, when the second accessory is attached to the antispasticity aid device, and the antispasticity aid device is attached to the hand of a stroke victim, the second accessory will permit the stroke victim to apply force against the leaf spring to provide physical therapy for arm muscles of the stroke victim.

(16) In another variant, a padded material is provided. The padded material is affixed to the upper surface of the support platform.

(17) In yet another variant, a padded material is provided. The padded material is affixed to the lower surface of the support platform.

(18) In yet a further variant, a compression spring is provided. The compression spring is located between the upper surface of the planar base and an underside of the hand-support

section of the support platform, thereby providing additional resistance to the stroke victim seeking physical therapy.

(19) In yet still another variant, at least one mounting bracket is provided. The mounting bracket is affixed to the lower surface of the planar hand-mounting member and is formed of resilient material. The mounting bracket is sized and shaped to removably attach to either a top bar of a walker or a cane handle whereby, the antispasticity aid device is easily attachable to either of the walker or cane handle by a stroke victim not able to adequately grip such devices with a hand.

(20) In a further variant, either a hooking portion or a looping portion of a removable attachment device is provided. The portion is affixed to the lower surface of the planar hand-mounting member. The portion provides a mechanism for removably attaching the antispasticity aid device to accessory devices.

(21) In still another variant, a third accessory is provided. The third accessory is comprised of an armrest portion. The armrest portion is formed of planar semi-rigid resilient material, has a hand-shaped section and an extension section. The hand-shaped section has an upper surface, a lower surface, a distal end and a proximate end and is sized and shaped to support the antispasticity aid device. The hand-shaped section has either a looping portion or a hooking portion of a removable attachment device affixed to the upper surface for attachment to the antispasticity aid device. The extension section has a first end and a second end and has a length greater than a distance from a back of a wrist of a stroke victim and is attached at the first end to the proximate end of the hand-shaped section. At least one reinforcing element is provided. The reinforcing element is formed of resilient material and is located within the armrest portion and extends from the second end of the extension section to at least into the

hand shaped section. A mounting hinge is provided. The mounting hinge has a first portion and a second portion and is attached at the first portion to the reinforcing element adjacent to the second end of the extension section and is attached at the second portion to a wall adjacent to either a toilet or a bathtub. The mounting hinge maintains the third accessory in a position

5 orthogonal to the wall whereby, when attached to the wall, the third accessory will provide a comfortable location for a stroke victim to rest an arm when using either the bathtub or the toilet.

(22) In still another variant, a fourth accessory is provided. The fourth accessory is comprised of a concave rest portion. The concave rest portion has an upper surface, a lower

10 surface and is sized and shaped to accommodate an arm of a stroke victim using one of the antispasticity aid devices on the upper surface. A support portion is provided. The support portion has a top surface and a bottom surface. The support portion is of a length sufficient to support the rest portion and is attached at the top surface to the lower surface of the rest portion. The support portion is of a height sufficient to maintain the rest portion at a desired

15 height. An attachment portion is provided. The attachment portion has an upper surface and a lower surface. The attachment portion is attached at the upper surface to the bottom surface of the support portion and is sized and shaped to fit frictionally over either the arm of a chair or sofa at the lower surface. Whereby, when fitted to either the arm of a chair or sofa, the fourth accessory will provide a comfortable and secure rest location for a stroke victim's arm.

20 (23) In yet another variant, a walker is provided. The walker has two pairs of downward pointing legs. Each of the pairs attaches at upper ends to a top cross bar. At least one leg of each pair is hingedly joined to at least one connecting bar. A support platform is provided. The support platform is pivotally attached to a bracket. The bracket is attached to the at least

one connecting bar. The platform has a first end for supporting a wrist of a stroke victim and a second end for supporting the antispasticity aid device. The second end has either a hooking portion or a looping portion of a removable attachment device positioned upon an upper surface for removable attachment to the antispasticity aid device. At least one elastic member is provided. The elastic member is located between the bracket and an underside of the support platform. The elastic member provides resistive stability for the platform when supporting a hand and arm of a stroke victim.

(24) In yet a further variant, a fifth accessory is provided. The fifth accessory is comprised of a floor bracket. The floor bracket has an upper surface, a lower surface, a pivotal mounting bracket affixed to the upper surface and a non-slip finish on the lower surface. An adjustable support shaft is provided. The support shaft has an upper portion and a lower portion. The lower portion fits slidably within the upper portion and has a clamping mechanism for adjustably fastening the upper portion to the lower portion at a variety of heights. The lower portion has a fitting affixed at a lower end. The fitting is sized and shaped to fit the pivotal mounting bracket. The upper portion has a handle at an upper end. The handle is sized and shaped to accept the mounting bracket of the antispasticity aid device whereby, when the antispasticity aid device is removably affixed to the handle, a stroke victim will use the fifth accessory to exercise the arm and shoulder muscles.

(25) In still another variant, a sixth accessory is provided. The sixth accessory is comprised of a support tab. The support tab has a first surface, a second surface, an aperture penetrating the first and second surfaces and either a hooking portion or a looping portion of a removable attachment device affixed to one of the first or second surfaces. The portion provides a mechanism for removably attaching the support tab to the antispasticity aid device. An elastic

chord is provided. The elastic chord has a first end, a second end and is attached at the first end to the support tab through the aperture. The elastic chord has a mechanism at the second end for forming a loop adjacent to the second end. The loop serves to attach the elastic chord to a support fixture whereby, when the antispasticity aid device is attached to the hand of a stroke victim, the antispasticity aid device is attached to the support tab and the loop is attached to the fixture, the hand and arm of the stroke victim will be suspended for ease of washing.

(26) In yet another variant, the sixth accessory is comprised of a weakened portion in the elastic chord. The weakened portion provides a safety feature for a stroke victim in the event the stroke victim should fall. The safety feature prevents the stroke victim from being suspended by the sixth accessory.

(27) In still a further variant, a coupling in the elastic chord is provided. The coupling has an attaching portion and a receiving portion. The attaching portion is affixed to an upper end of a lower portion of the elastic chord and has a head section and a reduced cross-section neck section located below the head section. The receiving portion is affixed to a lower end of an upper portion of the elastic chord having a cavity. The cavity is sized and shaped to frictionally fit over the attaching portion and has a resilient surrounding lower rim. The rim is sized and shaped to fit into the neck section whereby, when a downward pressure on the sixth accessory exceeds pressure required to locate the attaching portion in the receiving portion, the attaching portion and the receiving portions will separate. This provides a safety feature for a stroke victim using the sixth accessory.

(28) In yet a further variant, a seventh accessory is provided. The seventh accessory is comprised of a resilient arm support member. The arm support member has a first end, a

second end and is formed into a loop. The loop is joined by an intermediate bridging member. The resilient arm member is sized and shaped to fit frictionally over a wheelchair arm and to provide a channel at an upper surface suitable for resting of a stroke victim's arm. At least one retaining strap is provided. The retaining strap has a first portion and a second portion.

- 5 Each of the portions are attached to an outer edge of the loop and has either a looping means or a hooking means attached to the portions to permit the retaining strap to be fastened over an arm of a stroke victim.

(29) In still a further variant, a hand support platform is provided. The hand support platform is attached to at least one end of the loop and is sized and shaped to fit beneath the
10 antispasticity aid device. The hand support platform has a series of slots for accepting retaining straps to hold the antispasticity aid device to the hand support platform.

(30) In another variant, an eighth accessory is provided. The eighth accessory is comprised of a vertically oriented mounting structure. The mounting structure has an upper end, a lower end, a support base located at the lower end and a central adjusting tract. A bearing mount is
15 provided. The bearing mount is slidably affixed to the central adjusting track and has a curved exterior edge. A bearing is provided. The bearing is affixed to a center of the bearing mount. A planar positioning member is provided. The positioning member has a perimeter, a front surface, a rear surface and is affixed to the bearing at a center portion of the rear surface. A planar, L-shaped control bracket is provided. The control bracket is pivotally mounted
20 adjacent to a corner of the L-shape to the front surface of the positioning member adjacent to the perimeter. The control bracket has a control bracket bearing mounted at one end of the L-shape. At least one stop pin is provided. The stop pin is mounted to the front surface of the positioning member and is located between arms of the L-shaped control bracket. An

antispasticity aid support member is provided. The support member has an upper surface and a lower surface. The support member is pivotally mounted to the control bracket bearing and is sized and shaped to support the antispasticity aid device. The support member has either a hooking portion or a looping portion of a removable attachment device affixed to the upper surface of the support member for attachment to the antispasticity aid device. A first elastic member is provided. The first elastic member has a first end and a second end. The first elastic member is attached at the first end to the rear surface of the planar positioning member adjacent to the perimeter and is attached at the second end to the curved exterior edge of the bearing mount whereby, when the antispasticity aid device is attached to a hand of a stroke victim and the antispasticity aid device is attached to the support member, the eighth accessory will provide a mechanism for exercising arm muscles of the stroke victim, permitting rising extension of the arm muscles.

(31) In yet another variant, a second elastic member is provided. The elastic member has a first end and a second end. The elastic member is attached at the first end to the front surface of the planar positioning member inward from the perimeter and is attached at the second end to the support member. This provides additional stability for the arm of the stroke victim as the eighth accessory is used for exercising the arm of the stroke victim.

(32) In still a further variant, a ninth accessory is provided. The ninth accessory has a support platform. The support platform is formed of planar semi-rigid, resilient material and has a hand-support section and an arm support section and is attached to a wheelchair. The hand-support section has a distal end and a proximate end and is sized and shaped to support the antispasticity aid device. The arm support section has a first section and a second section. The first section has a first end and a second end. The second section has a first end and a

second end. The first section of the arm support section is attached at the first end to the proximate end of the hand-support section. An elastic element is provided. The elastic element has a front end and a rearward end. The front end of the elastic element is attached to the second end of the first section of the arm support section and the rearward end of the elastic element is attached to the first end of the second section of the arm support section. Whereby, when the ninth accessory is attached to the antispasticity aid device and the antispasticity aid device is attached to the hand of a stroke victim, the ninth accessory will permit the stroke victim to apply force against the elastic element to provide physical therapy for arm muscles of the stroke victim.

10 (33) In another variant, a means for attaching the front end of the elastic element to the second end of the first section of the arm support section and the rearward end of the elastic element to the first end of the second section of the arm support section is provided.

(34) In still another variant, at least one bracket is provided. The bracket has a first end, a second end and is attached to either the second end of the first section of the arm support section or the first end of the second section of the arm support section to the first end of the bracket.

15 (35) In a further variant, an extension spring is provided. The extension spring has a front end and a rearward end. The front end of the extension spring is attached to the second end of the first section of the arm support section and the rearward end of the extension spring is attached to the first end of the second section of the arm support section.

(36) In yet another variant, a mechanism of attaching the support platform at the second end of the second section of the arm support section to a hollow tube at the rear of the wheelchair is provided.

(37) In still a further variant, a plurality of detents is provided. The detents are located at the rear edge of the thumb-mounting member. A ball channel is provided. The ball channel is located in either the first side edge or the second side edge of the hand-mounting member. The ball channel has a compression spring located within the channel. A positioning ball is provided. The ball is sized and shaped to fit slidably within the channel and to fit within the detents. The ball is maintained in one of the detents by the compression spring whereby, when pressure is applied to a side edge of the thumb-mounting member, the ball will be moved from one detent to the next. The compression spring tends to maintain a position of the thumb-mounting member with respect to the hand-mounting member.

(38) In yet another variant, a plurality of notches is provided. The notches are located at either the first side edge or the second side edge of the hand-mounting member. A protruding finger is provided. The protruding finger is located at the rear edge of the thumb-mounting member and is sized and shaped to removably engage any one of the notches whereby, when the protruding finger is located in one of the notches, the finger will maintain a position of the thumb-mounting member with respect to the hand-mounting member.

(39) In still another variant, a raised padding portion is provided. The raised padding portion is formed of resilient padding material and is sized and shaped to fit over an upper surface of the planar hand-mounting member. Whereby, when the raised padding portion is fit over the upper surface of the planar hand-mounting member and the raised padding portion is attached to a hand of a stroke victim, the knuckles of the stroke victim will be elevated above the fingertips of the stroke victim thereby allowing the hand of the stroke victim to be comfortably positioned on the planar hand-mounting member.

(40) In yet still a further variant, the raised padding portion is formed of an FDA approved foam material.

(41) In still a further variant, the planar hand-mounting member is covered with a washable material.

5 (42) In a final variant, the washable material is removable and replaceable.

Description of the Drawings

Figure 1 is a plan view of the preferred embodiment of the invention including the rotatably attached thumb-mounting member;

10 **Figure 2** is a perspective view of the **Figure 1** embodiment illustrating the first and second restraining straps;

Figure 3 is a perspective view of the **Figure 1** embodiment illustrating the first accessory comprised of an armrest portion;

Figure 4 is a perspective view of a first accessory illustrating the upper and lower padding portions and the padded portion on the second end of the extension section;

Figure 5 is a perspective view of the first accessory illustrating the washable material covering the extension section;

Figure 5A is a side elevational view of the first accessory positioned on an arm of an armchair;

20 **Figure 5B** is a perspective view of the first accessory illustrating the hand-shaped section, the extension section and the upper and lower padding portion;

Figure 6 is a side elevational view of a second accessory illustrating the support platform and the planar base;

Figure 7 is a side elevational view of the second accessory illustrating the compression spring located between the planar base and the support platform;

Figure 8 is a perspective view of the second accessory illustrating the stroke victim seeking physical therapy provided by the additional resistance of the compression spring;

5 **Figure 9** is a perspective view of the underside of the mounting bracket affixed to the lower surface of the planar hand-mounting member;

Figure 10 is a perspective view of the underside of the hooking or looping portion of a removable attachment device affixed to the lower surface of the planar hand-mounting member;

10 **Figure 10A** is a perspective view of the planar hand-mounting member illustrating the raised padding portion attached on the upper surface and the washable material covering the planar hand-mounting member;

Figure 11 is a perspective view of a third accessory illustrating the arm-rest portion, the hand-shaped section, the extension section and the mounting hinge;

15 **Figure 12** is a perspective view of a fourth accessory illustrating the concave rest portion, the support portion and the attachment portion;

Figure 13 is perspective view of the support platform pivotally attached to a bracket attached to the connecting bar of a walker;

20 **Figure 14** is an elevated plan view of the support platform illustrating the at least one elastic member located between the bracket and the support platform;

Figure 15 is a perspective view of a fifth accessory illustrating the floor bracket, the adjustable support shaft, the lower portion and the upper portion with a handle;

Figure 16 is a perspective view of the sixth accessory illustrating the support tab, the elastic cord and the weakened portion in the elastic cord;

Figure 17 is a detailed side elevational view of the coupling in the elastic cord illustrating the attaching portion and the receiving portion;

5 **Figure 18** is a perspective view of the seventh accessory illustrating the resilient arm support member, the intermediate bridging member and the retaining strap;

Figure 18A is a perspective view of the seventh accessory fit frictionally over a wheelchair arm and providing a channel at the upper surface for resting a stroke victim's arm;

10 **Figure 19** is a perspective view of the hand support platform attached to at least one end of the loop;

Figure 20 is a rear perspective view of the eighth accessory illustrating the mounting structure, the bearing mount, the bearing and the planar positioning member;

15 **Figure 21** is a front perspective view of the eighth accessory illustrating the positioning member, the L-shaped control bracket, the control bracket, the stop pin and the antispasticity aid support member;

Figure 21A is a detailed side elevational view of the eighth accessory illustrating the antispasticity aid support member, the second elastic member, the control bracket, the L-shaped control bracket and the positioning member;

20 **Figure 22** is a rear perspective view of the ninth accessory illustrating the support platform attached to a wheelchair;

Figure 23 is a detailed side elevational view of the ninth accessory illustrating the first and second section of the arm support section, the elastic element and the means for attaching the front end of the elastic element to the second end of the first section of the arm support

section and the rearward end of the elastic element to the first end of the second section of the arm support section;

Figure 24 is partial cross-sectional plan view of the thumb-mounting member illustrating the plurality of detents, the ball channel, the compression spring and the positioning ball; and

Figure 25 is a partial cross-sectional plan view of the thumb-mounting member illustrating the plurality of notches and the protruding finger.

Detailed Description of the Preferred Embodiment

The present invention addresses all of the deficiencies or prior stroke victim aid inventions and satisfies all of the objectives described above.

(1) As shown in **Figures 1 – 3**, an antispasticity aid device **10** providing the desired features may be constructed from the following components. A planar hand-mounting member **15** is provided. The planar hand-mounting member **15** is formed of rigid material **20** and is sized and shaped to extend beyond the outer dimensions **25** of a human hand **30** without a thumb **35**. The planar hand-mounting member **15** has an upper surface **40**, a lower surface **45**, a front edge **50**, a rear edge **55**, a first side edge **60** and a second side edge **65**. The hand-mounting member **15** has at least two first fastening slots **70**, **75** located adjacent to the first **60** and second **65** side edges, respectively. A first restraining strap **80** is provided. The first restraining strap **80** is size and shaped to fit slidably through the first fastening slots **70**, **75** and has a means **85** for adjusting a length **90** of the first strap **80**.

A thumb-mounting member **95** is provided. The thumb-mounting member **95** is formed of rigid material **100** and is sized and shaped to extend beyond the outer dimensions

105 of the human thumb 35. The thumb-mounting member 95 has an upper surface 110, a lower surface 115, a front edge 120, a rear edge 125, a first side edge 130 and a second side edge 135. The thumb-mounting member 95 has at least two second fastening slots 140, 145 located adjacent to the first 130 and the second 135 side edges of the thumb-mounting

5 member 95, respectively. A second restraining strap 150 is provided. The second strap 150 is sized and shaped to fit slidably through the second fastening slots 140, 145 and has a means 155 for adjusting a length 160 of the second strap 150. The thumb-mounting member 95 is rotatably attached at its rear edge 125 to the first side edge 60 of the hand-mounting member 15. This permits the thumb-mounting member 95 to rotate through an arc 165 in the plane of
10 the hand-mounting member 95 whereby, when the hand 30 of a stroke victim 170 is placed upon the hand-mounting member 15, the first restraining strap 80 is located over the hand 30 and through the first fastening slots 70, 75.

The length 90 of the first restraining strap 80 is adjusted to hold the hand 30 in firm contact with the hand-mounting member 15 and when the thumb 35 of a stroke victim 170 is
15 placed upon the thumb-mounting member 95, the second restraining strap 150 is located over the thumb 35 and through the second fastening slots 140, 145. The length 160 of the second restraining strap 150 is adjusted to hold the thumb 35 in firm contact with the thumb-mounting member 95. The thumb-mounting member 95 is adjustable with respect to the hand-mounting member 15 for comfort of the spasticity victim 170.

20 (2) In a variant, as shown in **Figure 2** and **Figure 3**, the means 85, 155 for adjusting the length 90, 160 of either the first 80 or second 150 restraining straps is further comprised of a hooking element 175 located adjacent to a first end 180, 185 of the restraining strap 80, 150. A looping element 190 extends from a second end 195, 200 of the restraining strap 80, 150

toward the first end **180, 185** whereby, when the hooking element **175** is attached to the looping element **190** at different points along the length **90, 160** of the restraining strap **80, 150**, the length **90, 160** of either of the first **80** or the second **150** restraining strap is adjusted.

(3) In another variant, as shown in **Figure 1**, the thumb-mounting member **95** is lockable in a plurality of positions about a point **210** where it is rotatably attached at its rear edge **125** to the first side edge **60** of the hand-mounting member **15**.

(4) In yet another variant, as shown in **Figures 3 – 5, 5A and 5B**, a first accessory **215** is provided. The first accessory **215** is comprised of an armrest portion **220**. The armrest portion **220** is formed of planar semi-rigid resilient material **225**, has a hand-shaped section **230** and an extension section **235**. The hand-shaped section **230** has a distal end **240** and a proximate end **245** and is sized and shaped to support the antispasticity aid device **10**. The extension section **235** has a first end **250** and a second end **255** and has a length **260** less than a distance **265** from an armpit **270** to a wrist **275** of a stroke victim **170**. The extension section **235** is attached at the first end **250** to the proximate end **245** of the hand-shaped section **230**. The first accessory **215** is attached to the antispasticity aid device **10** by either the first **80** and the second **150** fastening straps or the hooking **175** and the looping **190** fastening portions whereby when the first accessory **215** is attached to the antispasticity aid device **10** and the antispasticity aid device **10** is attached to the hand **30** of a stroke victim **170**, an arm **280** of the stroke victim **170** may be comfortably positioned on an arm **285** of an armchair **290** or sofa (not shown).

(5) In yet a further variant, as shown in **Figure 4 and Figure 5**, an upper padding portion **300** is provided. The upper padding portion **300** is formed of resilient padding material **305** and is sized and shaped to fit over an upper surface **310** of the extension section **235** of the

arm-rest portion **220**. Whereby, when the first accessory **215** is attached to the antispasticity aid device **10**, the antispasticity aid device **10** is attached to the hand **30** of a stroke victim **170** and the upper padding portion **300** is positioned over the extension section **235**, the arm **280** of the stroke victim **170** will be more comfortably positioned upon the first accessory **215**.

5 (6) In still yet another variant, as shown in **Figure 4** and **Figure 5**, a lower padding portion **315** is provided. The lower padding portion **315** is formed of resilient padding material **305** and is sized and shaped to fit over a lower surface **320** of the extension section **235** of the arm-rest portion **220**. Whereby, when the first accessory **215** is attached to the antispasticity aid device **10**, the antispasticity aid device **10** is attached to the hand **30** of a
10 stroke victim **170** and the lower padding portion **315** is positioned under the extension section **235**, the arm **280** of the stroke victim **170** will be more comfortably positioned upon the first accessory **215**.

(7) In a further variant, as shown in **Figure 4A** and **Figure 4B**, the extension section **235** tapers in a vertical plane **325** from the first end **250** to the second end **255**, thereby lowering a
15 point of contact **330** adjacent to the armpit **270** of the stroke victim **170**.

(8) In still another variant, as shown in **Figure 4** and **Figure 5**, the upper padding portion **300** is formed of an FDA approved foam material **335**.

(9) In yet another variant, as shown in **Figure 4** and **Figure 5**, the lower padding portion **315** is formed of an FDA approved foam material **335**.

20 (10) In still yet another variant, as shown in **Figure 5**, the extension section **235** is covered with washable material **340**.

(11) In yet another variant, as shown in **Figure 5**, the washable material **340** is removable and replaceable.

(12) In a further variant, as shown in **Figure 4**, the second end **255** of the extension section **235** is comprised of a padded portion **345**. The padded portion **345** is sized and shaped to fit comfortably into the armpit **270** of a stroke victim **170**.

(13) In yet another variant, as shown in **Figure 3**, **Figure 4A** and **Figure 5**, at least one pair of attachment slots **350**, **352** is provided. The attachment slots **350**, **352** are located along side edges **355** of the extension section **235** between the first end **250** and the second end **255** and is sized and shaped to accommodate an attachment strap **360**.

(14) In another variant, as shown in **Figure 4**, either a hooking portion **365** or a looping portion **370** of a removable attachment device **375** is provided. The portion **365**, **370** is affixed to an upper surface **380** of the hand shaped section **230**. The portion **365**, **370** provides a mechanism for removably attaching to the antispasticity aid device **10**.

(15) In still yet another variant, as shown in **Figure 6**, a second accessory **385** is provided. The second accessory **385** is comprised of a support platform **390**. The support platform **390** is formed of planar semi-rigid, resilient material **225**, has an upper surface **391**, a lower surface **392**, has a hand-support section **395** and an arm support section **400**. The hand support section **395** has a distal end **405**, a proximate end **410** and is sized and shaped to support the antispasticity aid device **10**. The arm support section **400** has a first end **415**, a second end **420** and has a length **425** less than a distance **265** from an armpit **270** to a wrist **275** of a stroke victim **170**. The arm support section **400** is attached at the first end **415** to the proximate end **410** of the hand-support section **395**. The second accessory **385** is attached to the antispasticity aid device **10** using either the first **80** and the second **150** fastening straps or the hooking **175** and the looping **190** fastening portions. A planar base **420** is provided. The planar base **420** has an upper surface **421**, a lower surface **422** and is sized and shaped to fit

beneath the support platform 390. A leaf spring 425 is provided. The leaf spring 425 has an upper section 430 and a lower section 435 and is formed with an acute angle 440 between the upper section 430 and the lower section 435. The upper section 430 is affixed to the lower surface 392 of the support platform 390 and the lower section 435 is affixed to the upper surface 421 of the planar base 420. Whereby, when the second accessory 385 is attached to the antispasticity aid device 10, and the antispasticity aid device 10 is attached to the hand 30 of a stroke victim 170, the second accessory 385 will permit the stroke victim 170 to apply force against the leaf spring 425 to provide physical therapy for arm muscles 440 of the stroke victim 170.

10 (16) In another variant, as shown in **Figures 6 – 8**, a padded material 445 is provided. The padded material 445 is affixed to the upper surface 391 of the support platform 390.

(17) In another variant, as shown in **Figures 6 - 8**, a padded material 445 is provided. The padded material 445 is affixed to the lower surface 392 of the support platform 390.

(18) In yet a further variant, as shown in **Figure 7** and **Figure 8**, a compression spring 455 is provided. The compression spring 455 is located between the upper surface 421 of the planar base 420 and an underside 460 of the hand-support section 395 of the support platform 390, thereby providing additional resistance to the stroke victim 170 seeking physical therapy.

(19) In yet still another variant, as shown in **Figure 9**, **Figure 13** and **Figure 15**, at least one mounting bracket 465 is provided. The mounting bracket 465 is affixed to the lower surface 45 of the planar hand-mounting member 15 and is formed of resilient material 225. The mounting bracket 465 is sized and shaped to removably attach to either a top bar 470 of a walker 475 or a cane handle 480 whereby, the antispasticity aid device 10 is easily attachable

to either of the walker **475** or cane handle **480** by a stroke victim **170** not able to adequately grip such devices **475, 480** with a hand **30**.

(20) In a further variant, as shown in **Figure 10**, either a hooking portion **365** or a looping portion **370** of a removable attachment device **375** is provided. The portion **365, 370** is

5 affixed to the lower surface **45** of the planar hand-mounting member **15**. The portion **365, 370** provides a mechanism for removably attaching the antispasticity aid device **10** to accessory devices **215, 385, 485, 585, 740, 820, 935, 1020, 1195**.

(21) In another variant, as shown in **Figure 11**, a third accessory **485** is provided. The third accessory **485** is comprised of an arm-rest portion **490**. The arm-rest portion **490** is formed of

10 planar semi-rigid resilient material **225**, has a hand-shaped section **495** and an extension section **500**. The hand-shaped section **495** has an upper surface **505**, a lower surface **510**, a distal end **515** and a proximate end **520** and is sized and shaped to support the antispasticity aid device **10**. The hand-shaped section **495** has either a looping portion **370** or a hooking portion **365** of a removable attachment device **375** affixed to the upper surface **505** for

15 attachment to the antispasticity aid device **10**. The extension section **500** has a first end **525** and a second end **530** and has a length **535** greater than a distance from a back of a wrist **275** of a stroke victim **170** and is attached at the first end **525** to the proximate end **520** of the hand-shaped section **495**. At least one reinforcing element **550** is provided. The reinforcing element **550** is formed of resilient material **25** and is located within the arm-rest portion **490**

20 and extends from the second end **530** of the extension section **500** to at least into the hand shaped section **495**. A mounting hinge **555** is provided. The mounting hinge **555** has a first portion **560** and a second portion **565** and is attached at the first portion **560** to the reinforcing element **550** adjacent to the second end **530** of the extension section **500** and is attached at the

second portion **565** to a wall **570** adjacent to either a toilet **575** or a bathtub (not shown). The mounting hinge **555** maintains the third accessory **485** in a position orthogonal to the wall **570** whereby, when attached to the wall **570**, the third accessory **485** will provide a comfortable location for a stroke victim **170** to rest an arm **280** when using either the bathtub (not shown) or the toilet **575**.

(22) In still another variant, as shown in **Figure 12**, a fourth accessory **585** is provided.

The fourth accessory **585** is comprised of a concave rest portion **590**. The concave rest portion **590** has an upper surface **600**, a lower surface **605** and is sized and shaped to accommodate an arm **280** of a stroke victim **170** using one of the antispasticity aid devices **10** on the upper surface **600**. A support portion **610** is provided. The support portion **610** has a top surface **615** and a bottom surface **620**. The support portion **610** is of a length **625** sufficient to support the rest portion **590** and is attached at the top surface **615** to the lower surface **605** of the rest portion **590**. The support portion **610** is of a height **630** sufficient to maintain the rest portion **590** at a desired height **635**. An attachment portion **640** is provided.

The attachment portion **640** has an upper surface **645** and a lower surface **650**. The attachment portion **640** is attached at the upper surface **645** to the bottom surface **620** of the support portion **610** and is sized and shaped to fit frictionally over either the arm **285** of a chair **290** or sofa (not shown) at the lower surface **650**. Whereby, when fitted to either the arm **285** of a chair **290** or sofa (not shown), the fourth accessory **585** will provide a comfortable and secure rest location for a stroke victim's arm **280**.

(23) In yet another variant, as shown in **Figure 13** and **Figure 14**, a walker **475** is provided. The walker **475** has two pairs of downward pointing legs **660**, **665**. Each of the pairs **660**, **665** attaches at upper ends **670**, **675** to a top cross bar **470**, **471**. At least one leg **685**, **690** of each

pair **660, 665** is hingedly joined to at least one connecting bar **695, 696**. A support platform **700** is provided. The support platform **700** is pivotally attached to a bracket **705**. The bracket **705** is attached to the at least one connecting bar **695, 696**. The platform **700** has a first end **710** for supporting a wrist **275** of a stroke victim **170** and a second end **720** for supporting the
 5 antispasticity aid device **10**. The second end **720** has either a hooking portion **365** or a looping portion **370** of a removable attachment device **375** positioned upon an upper surface **725** for removable attachment to the antispasticity aid device **10**. At least one elastic member **730** is provided. The elastic member **730** is located between the bracket **705** and an underside **735** of the support platform **700**. The elastic member **730** provides resistive stability for the
 10 platform **700** when supporting the hand **30** and arm **280** of a stroke victim **170**.

(24) In yet a further variant, as shown in **Figure 9** and **Figure 15**, a fifth accessory **740** is provided. The fifth accessory **740** is comprised of a floor bracket **745**. The floor bracket **745** has an upper surface **750**, a lower surface **755**, a pivotal mounting bracket **760** affixed to the upper surface **750** and a non-slip finish **765** on the lower surface **755**. An adjustable support
 15 shaft **770** is provided. The support shaft **770** has an upper portion **775** and a lower portion **780**. The lower portion **780** fits slidably within the upper portion **775** and has a clamping mechanism **785** for adjustably fastening the upper portion **775** to the lower portion **780** at a variety of heights. The lower portion **780** has a fitting **795** affixed at a lower end **800**. The fitting **795** is sized and shaped to fit the pivotal mounting bracket **760**. The upper portion **775**
 20 has a handle **480** at an upper end **810**. The handle **480** is sized and shaped to accept the mounting bracket **465** of the antispasticity aid device **10** whereby, when the antispasticity aid device **10** is removably affixed to the handle **480**, a stroke victim **170** will use the fifth accessory **740** to exercise the arm **440** and shoulder **815** muscles.

(25) In still another variant, as shown in **Figure 16**, a sixth accessory **820** is provided. The sixth accessory **820** is comprised of a support tab **825**. The support tab **825** has a first surface **830**, a second surface **835**, an aperture **840** penetrating the first **830** and second **835** surfaces and either a hooking portion **365** or a looping **370** portion of a removable attachment device **375** affixed to one of the first **830** or second **835** surfaces. The portion **365**, **370** provides a mechanism for removably attaching the support tab **825** to the antispasticity aid device **10**.

An elastic chord **840** is provided. The elastic chord **840** has a first end **845**, a second end **850** and is attached at the first end **845** to the support tab **825** through the aperture **840**. The elastic chord **840** has a mechanism **852** at the second end **850** for forming a loop **855** adjacent to the second end **850**. The loop **855** serves to attach the elastic chord **840** to a support fixture **860** whereby, when the antispasticity aid device **10** is attached to a hand **30** of a stroke victim **170**, the antispasticity aid device **10** is attached to the support tab **825** and the loop **855** is attached to the fixture **860**, the hand **30** and arm **280** of the stroke victim **170** will be suspended for ease of washing.

(26) In yet another variant, as shown in **Figure 16**, the sixth accessory **820** is comprised of a weakened portion **870** in the elastic chord **840**. The weakened portion **870** provides a safety feature **875** for the stroke victim **170** in the event the stroke victim **170** should fall. The safety feature **875** prevents the stroke victim **170** from being suspended by the sixth accessory **820**.

(27) In still a further variant, as shown in **Figure 17**, a coupling **872** in the elastic chord **840** is provided. The coupling **872** has an attaching portion **875** and a receiving portion **880**. The attaching portion **875** is affixed to an upper end **885** of a lower portion **890** of the elastic chord **840** and has a head section **895** and a reduced cross-section neck section **900** located below the head section **895**. The receiving portion **880** is affixed to a lower end **905** of an upper

portion **910** of the elastic chord **840** having a cavity **915**. The cavity **915** is sized and shaped to frictionally fit over the attaching portion **875** and has a resilient surrounding lower rim **920**. The rim **920** is sized and shaped to fit into the neck section **900** whereby, when a downward pressure on the sixth accessory **820** exceeds pressure required to locate the attaching portion

5 **875** in the receiving portion **880**, the attaching portion **875** and the receiving portions **880** will separate. This provides a safety feature **930** for a stroke victim **170** using the sixth accessory **820**.

(28) In yet a further variant, as shown in **Figure 18** and **Figure 18A**, a seventh accessory **935** is provided. The seventh accessory **935** is comprised of a resilient arm support member

10 **940**. The arm support member **940** has a first end **945**, a second end **950** and is formed into a loop **955**. The loop **955** is joined by an intermediate bridging member **960**. The resilient arm support member **940** is sized and shaped to fit frictionally over a wheelchair arm **965** and to provide a channel **970** at an upper surface **975** suitable for resting of a stroke victim's arm

280. At least one retaining strap **980** is provided. The retaining strap **980** has a first portion

15 **985** and a second portion **990**. Each of the portions **985**, **990** are attached to an outer edge **995** of the loop **955** and has either a looping means **1000** or a hooking means **1005** attached to the portions **985**, **990** to permit the retaining strap **980** to be fastened over an arm **280** of a stroke victim **170**.

(29) In still a further variant, as shown in **Figure 19**, a hand support platform **1010** is

20 provided. The hand support platform **1010** is attached to at least one end **945**, **950** of the loop **955** and is sized and shaped to fit beneath the antispasticity aid device **10**. The hand support platform **1010** has a series of slots **1015** for accepting retaining straps **980** to hold the antispasticity aid device **10** to the hand support platform **1010**.

(30) In another variant, as shown in **Figure 20**, **Figure 21** and **Figure 21A**, an eighth accessory **1020** is provided. The eighth accessory **1020** is comprised of a vertically oriented mounting structure **1025**. The mounting structure **1025** has an upper end **1030**, a lower end **1035**, a support base **1040** located at the lower end **1035** and a central adjusting tract **1045**. A bearing mount **1050** is provided. The bearing mount **1050** is slidably affixed to the central adjusting track **1045** and has a curved exterior edge **1052**. A bearing **1055** is provided. The bearing **1055** is affixed to a center **1060** of the bearing mount **1050**. A planar positioning member **1065** is provided. The positioning member **1065** has a perimeter **1070**, a front surface **1075**, a rear surface **1080** and is affixed to the bearing **1055** at a center portion **1085** of the rear surface **1080**. A planar, L-shaped control bracket **1090** is provided. The control bracket **1090** is pivotally mounted adjacent to a corner **1095** of the L-shape **1100** to the front surface **1075** of the positioning member **1050** adjacent to the perimeter **1070**. The control bracket **1090** has a control bracket bearing **1105** mounted at one end **1110** of the L-shape **1100**. At least one stop pin **1112** is provided. The stop pin **1112** is mounted to the front surface **1075** of the positioning member **1065** and is located between arms **1115** of the L-shaped control bracket **1090**. An antispasticity aid support member **1120** is provided. The support member **1120** has an upper surface **1125** and a lower surface **1130**. The support member **1120** is pivotally mounted to the control bracket bearing **1105** and is sized and shaped to support the antispasticity aid device **10**. The support member **1120** has either a hooking portion **365** or a looping portion **370** of a removable attachment device **375** affixed to the upper surface **1125** of the support member **1130** for attachment to the antispasticity aid device **10**. A first elastic member **1135** is provided. The first elastic member **1135** has a first end **1140** and a second end **1145**. The first elastic member **1135** is attached at the first end **1140** to

the rear surface **1080** of the planar positioning member **1065** adjacent to the perimeter **1070** and is attached at the second end **1145** to the curved exterior edge **1052** of the bearing mount **1050** whereby, when the antispasticity aid device **10** is attached to a hand **30** of a stroke victim **170** and the antispasticity aid device **10** is attached to the support member **1120**, the eighth accessory **1020** will provide a mechanism for exercising arm muscles **440** of the stroke victim **170**, permitting rising extension of the arm muscles **440**.

(31) In yet another variant, as shown in **Figure 21** and **Figure 21A**, a second elastic member **1150** is provided. The elastic member **1150** has a first end **1155** and a second end **1160**. The elastic member **1150** is attached at the first end **1155** to the front surface **1075** of the planar positioning member **1065** inward from the perimeter **1070** and is attached at the second end **1160** to the support member **1120**. This provides additional stability for the arm **280** of the stroke victim **170** as the eighth accessory **1020** is used for exercising the arm **280** of the stroke victim **170**.

(32) In still a further variant, as shown in **Figure 22** and **Figure 23**, a ninth accessory **1195** is provided. The ninth accessory **1195** has a support platform **1200**. The support platform **1200** is formed of planar semi-rigid, resilient material **225** and has a hand-support section **1205** and an arm support section **1210** and is attached to a wheelchair **1215**. The hand-support section **1205** has a distal end **1220** and a proximate end **1225** and is sized and shaped to support the antispasticity aid device **10**. The arm support section **1210** has a first section **1230** and a second section **1235**. The first section **1230** has a first end **1240** and a second end **1245**. The second section **1235** has a first end **1250** and a second end **1255**. The first section **1230** of the arm support section **1210** is attached at the first end **1240** to the proximate end **1225** of the hand-support section **1205**. An elastic element **1260** is provided. The elastic element

1260 has a front end 1265 and a rearward end 1270. The front end 1265 of the elastic element 1260 is attached to the second end 1245 of the first section 1230 of the arm support section 1210 and the rearward end 1270 of the elastic element 1260 is attached to the first end 1250 of the second section 1235 of the arm support section 1210. Whereby, when the ninth accessory 1195 is attached to the antispasticity aid device 10 and the antispasticity aid device 10 is attached to the hand 30 of a stroke victim 170, the ninth accessory 1195 will permit the stroke victim 170 to apply force against the elastic element 1260 to provide physical therapy for arm muscles 440 of the stroke victim 170.

(33) In another variant, as shown in **Figure 22** and **Figure 23**, a means 1275 for attaching the front end 1265 of the elastic element 1260 to the second end 1245 of the first section 1230 of the arm support section 1210 and the rearward end 1270 of the elastic element 1260 to the first end 1250 of the second section 1235 of the arm support section 1210 is provided.

(34) In still another variant, as shown in **Figure 23**, at least one bracket 1280 is provided. The bracket 1280 has a first end 1285, a second end 1290 and is attached to either the second end 1245 of the first section 1230 of the arm support section 1210 or the first end 1250 of the second section 1235 of the arm support section 1210 to the first end 1285 of the bracket 1280.

(35) In a further variant, as shown in **Figure 22** and **Figure 23**, an extension spring 1295 is provided. The extension spring 1295 has a front end 1300 and a rearward end 1305. The front end 1300 of the extension spring 1295 is attached to the second end 1245 of the first section 1230 of the arm support section 1210 and the rearward end 1305 of the extension spring 1295 is attached to the first end 1250 of the second section 1235 of the arm support section 1210.

(36) In yet another variant, as shown in **Figure 22**, a mechanism **1310** of attaching the support platform **1200** at the second end **1255** of the second section **1235** of the arm support section **1210** to a hollow tube **1315** at the rear of the wheelchair **1215** is provided.

(37) In still a further variant, as shown in **Figure 24**, a plurality of detents **1165** is provided.

5 The detents **1165** are located at the rear edge **125** of the thumb-mounting member **95**. A ball channel **1170** is provided. The ball channel **1170** is located in either the first side edge **60** or the second side edge **65** of the hand-mounting member **15**. The ball channel **1170** has a compression spring **1175** located within the channel **1170**. A positioning ball **1180** is provided. The ball **1180** is sized and shaped to fit slidably within the channel **1170** and to fit
10 within the detents **1165**. The ball **1180** is maintained in one of the detents **1165** by the compression spring **1175** whereby, when pressure is applied to the side edge **130**, **135** of the thumb-mounting member **95**, the ball **1180** will be moved from one detent **1165** to the next. The compression spring **1175** tends to maintain a position of the thumb-mounting member **95** with respect to the hand-mounting member **15**.

15 (38) In another variant, as shown in **Figure 25**, a plurality of notches **1185** is provided. The notches **1185** are located at either the first side edge **60** or the second side edge **65** of the hand-mounting member **15**. A protruding finger **1190** is provided. The protruding finger **1190** is located at the rear edge **125** of the thumb-mounting member **95** and is sized and shaped to removably engage any one of the notches **1185** whereby, when the protruding finger **1190** is
20 located in one of the notches **1185**, the finger **1190** will maintain a position of the thumb-mounting member **95** with respect to the hand-mounting member **15**.

(39) In still another variant, as shown in **Figure 10A** and **Figure 18A**, a raised padding portion **1195** is provided. The raised padding portion **1195** is formed of resilient padding

material **305** and is sized and shaped to fit over an upper surface **40** of the planar hand-mounting member **15**. Whereby, when the raised padding portion **1195** is fit over the upper surface **40** of the planar hand-mounting member **15** and the raised padding portion **1195** is attached to a hand **30** of a stroke victim **170**, the knuckles **1200** of the stroke victim **170** will
5 be elevated above the fingertips **1205** of the stroke victim **170** thereby allowing the hand **30** of the stroke victim **170** to be comfortably positioned on the planar hand-mounting member **15**.

(40) In yet still a further variant, as shown in **Figure 10A**, the raised padding portion **1195** is formed of an FDA approved foam material **335**.

(41) In still a further variant, as shown in **Figure 10A**, the planar hand-mounting member
10 **15** is covered with a washable material **340**.

(42) In a final variant, as shown in **Figure 10A**, the washable material **340** is removable and replaceable.